

TUBEROUS CORYDALIS IN THE MEDITERRANEAN CHECKLIST AREA

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ABSTRACT. A brief account of the tuberous species of the sections *Corydalis* and *Leonticoides* (*Corydalis*, Papaveraceae) in the Mediterranean area is given. *Corydalis solida* subsp. *incisa* Lidén, *C. triternata* Zuccarini, *C. brevipedicellata* Lidén, *C. haussknechtii* Lidén, *C. paschei* Lidén, *C. tauricola* (Cullen & Davis) Lidén, *C. wendelboi* Lidén, *C. erdelii* Zuccarini, and *C. oppositifolia* DC. subsp. *oppositifolia* and subsp. *kurdica* (Cullen & Davis) Lidén, are recognized as new or previously neglected taxa.

INTRODUCTION

While working with the rich collection of live tuberous *Corydalis* in Göteborg Botanical Garden, I soon realized that the current systematical opinions—as expressed in e.g. Flora of Turkey—did not hold, and that several new species had to be described. It was also considered urgent that those new species were published prior to the appearance of *Mediterranean Checklist* vol. 4. Therefore a full treatment is not given and only new taxa are described in full. I have adapted the form of this paper so as to comply with the Med-Checklist as regards distributional abbreviations. Specimen citations and distribution maps are given for the Turkish taxa only.

I. SECT. CORYDALIS

Corydalis sect. **Corydalis**

Syn.: *Corydalis* sect. *Pes-gallinaceus* Irmisch in Abh. Naturf. Ges. Halle 6:273 (1867); sect. *Pes-gallinaceus* subsect. *Globosae* v. Poelln. in Repert. Spec. Nov. Regni Veg. 42:101 (1937).

Tuber solid, annually regenerated. Stems with usually two petiolate leaves and a conspicuous scale leaf below the lowest leaf, usually branched from the scale leaf. Sepals usually very small or absent. Nectary tapering, fused to the spur in the basal part only.

1. **C. intermedia** (L.) Mérat, Nouv. Fl. Env. Par. 272 (1812).

Syn.: *Fumaria bulbosa* var. *intermedia* L., Sp. Pl. 699 (1753); *F. fabacea* Retz., Prod. Fl. Scand. ed 2:167, *C. fabacea* (Retz.) Pers., Syn. 2:269. Type: Burser 7:102 (UPS).

Most of Europe, except the extreme west and south. Ga†, It, Ju, Hs.

2. **C. pumila** (Host) Reichenb., Fl. Germ. Excurs. 698 (1832).

Syn.: *Fumaria pumila* Host, Fl. Austriaca 2:304 (1831). *Pistolochia pumila* (Host) Soják in Cas. Nar. Muz. (Prague) 140:129 (1972).

Type: Described from near Vienna, n.v.

Most of Europe. Ga, Co, Ju, Sa.

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†Abbreviations as in Greuter et al., Mediterranean Checklist vol. 1 (1984).

3. *C. solida* (L.) Clairv., Man. Herbor. Suisse 371 (1811).

Syn.: *Fumaria bulbosa* var. *solida* L., Sp. Pl. 699 (1753); *C. bulbosa* (L.) DC., Fl. Fr. 4:637 (1805), nom. rej.; *Pistolochia solida* (L.) Bernh., Syst. Verz. 57 (1800). Type: LINN 881-5.

Stems (4-)10-30cm. Leaves bi- to triternate with more or less lobed segments. Racemes dense. Pedicels 5-15mm. Corolla (15-)18-28mm long; outer petals with broad, usually emarginate blades; lower petal usually with a sub-basal pouch. Fruit 15-20mm, broadly elliptic to broadly lanceolate, pendent when ripe; ovary often geniculate at base of style. Nectary usually more than half as long as spur. Self-sterile.

Most of Europe. Al, Ag, Bu, Co, Ga, Gr, Hs, It, Ju, Sa, Si, Tu, An?

C. solida is here treated in a wide sense, including *C. densiflora* and *C. slivenensis*. This attitude is taken because of the occurrence of intermediates in some areas, especially between subsp. *solida*, subsp. *slivenensis* and subsp. *incisa*.

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|----|---|------------------------------|
| 1. | Bracts entire, or divided with entire segments | 2 |
| + | Bracts divided with lobed or dentate segments | 3 |
| 2. | Leaves usually biternate with broadly obovate segments, corolla yellow(?), white or yellowish purple | a. subsp. <i>slivenensis</i> |
| + | Leaves triternate, corolla usually lilac, purple or pink | c. subsp. <i>solida</i> |
| 3. | Outer petals obtuse; style very short, straight; pedicels 4-8mm; lobes of bracts apically divided, obtuse | d. subsp. <i>densiflora</i> |
| + | Outer petals emarginate; style long, usually geniculate at base; pedicels 5-15mm, lobes of bracts with lateral segments | b. subsp. <i>incisa</i> |

a. subsp. *slivenensis* (Velen.) Hayek, Prodr. Fl. Penins. Balcan. 1:364 (1925).

Syn.: *C. slivenensis* Velen., Fl. Bulg. 20 (1881); Jordanov, Fl. Reip. Pop. Bulg. 4:299 (1970); *Pistolochia solida* (L.) Bernh. subsp. *slivenensis* (Velen.) Soják in Cas. Nar. Muz. (Prague) 140:129 (1972); *Pistolochia slivenensis* (Velen.) Holub in Folia Geobot. Phytotax. 8:172 (1973). Type: Bulgaria, Sliven, 1884, *Skorpil* (PRC, n.v.).

C. balcanica Velen. op.cit. 21 (1881). Type: Bulgaria, Vitosa, *Skorpil* (PRC, n.v.).

C. bicalcarata Velen. op.cit. 20 (1881). Type: Bulgaria, Vitosa, *Skorpil* (PRC, n.v.).

C. pirotensis Adam. in Allg. Bot. Zeitschir 79 (1896). Type: Serbia, *Pirot* (n.v.).

C. tenella sensu Hayek, Prodr. Fl. Penins. Balcan. 1:364 (1925), non Ledebour.

C. solida sensu Jordanov op.cit.: 301 (1970) p.p.

Stems 15(-20)cm. Leaves often biternate with broadly obovate segments. Racemes (3-)5-10(-20)-flowered. Bracts about as long as or longer than pedicels, shallowly to deeply toothed or lobed, the upper sometimes entire. Corolla 20-25mm, pale yellow to pale purple, spur

longer than in subsp. *solida*; lower petal broadly emarginate, usually with a sub-basal pouch. *Fruit* 10–15mm, with long, often geniculate style. Bulgaria, SE Yugoslavia, Turkey. Bu, Ju, Tu (*Demiriz* 4710, E), An? (*Sintenis* 3821, E), small specimens mixed with *C. wendelboi*. Fig. 3.

This taxon is given specific status in *Flora Bulgarica*, but transitions between this and subsp. *solida* are locally frequent.

b. subsp. *incisa* Lidén, subsp. nov. Fig. 1D–F.

Syn.: *C. tenuis* Schott, Nyman & Kotschy, *Analecta Botanica* 42 (1854).

Type: 'In Dalmatiae montosis', *Fr. Maly*, n.v.

C. solida var. *densiflora* subvar. *tenuisecta* (Boiss.) v. Poelln. in Repert. Spec. Nov. Regni Veg. 45:111 (1938) sensu v. Poelln., excl. type.

C. solida var. *densiflora* subvar. *taygetana* Fedde in Repert. Spec. Nov. Regni Veg. 16:190 (1919). Type: Greece, Taygetos, 11 iv 1849, *Heldreich* 239 (B, GB).

C. solida subsp. *densiflora* sensu Hayek, *Prodr. Fl. Penins. Balcan.* 1:364 (1925).

C. densiflora sensu Halaczky, *Consp. Fl. Graec.* 1:44 (1901) and Papanicolaou in Strid, *Mountain Flora of Greece* (1985), non *densiflora* Presl.

Folia triternatisecta foliolis plus minus divisis segmentis ultimis anguste linearibus ad lanceolatis. Racemi (3–)8–22-flori. Bractae profunde incisae lobis incisus vel dentatis pedicellis brevis longiores. Flores pallide rosei, 21–27(–30)mm longi calcaribus robustis. Petalum inferius basin saepe saccatum, apicibus latioribus emarginatis. Capsula 15–18mm longa, pendula. Stylus longus, plerumque geniculatus.

Type: Greece, Peloponnisos, Chelmos, 1800m, 7 vi 1933, *O. Cyrén* (holo. GB, iso. S).

Stems 6–15(–20)cm. *Leaves* triternate with lobed leaflets; ultimate segments narrowly linear to lanceolate. *Racemes* (3–)8–22-flowered, rather long. *Bracts* deeply divided with the lobes again lobed or dentate. *Pedicels* 5–10(–15)mm, usually distinctly shorter than bracts. *Corolla* usually pale pink, 21–27(–30)mm long with rather coarse spur; lower petal broad, emarginate, often with a small apiculus in the sinus. *Fruit* 15–18mm, pendent, with long style. $2n = 16$. Self-sterile.

Mountains 1000–2200m. Balkan peninsula northwards to Montenegro and W Macedonia. Al, Gr, Ju.

Very variable. On Peloponnisos and SE Balkan peninsula with long racemes and large bracts which lengthen at base after anthesis. On Peloponnisos the variation in leaf shape is considerable, both within and between populations. At high altitudes in W Greece, Albania, and SW Yugoslavia the plants are usually smaller with denser racemes, smaller bracts, pinkish-lilac flowers and more tapering spurs. Plants from Andros (Aegeis) differ by their lax racemes and very large flowers (30mm long) without a basal pouch to the lower petal.

c. subsp. *solida*.

Stems (7–)10–25(–30)cm. *Leaves* triternate (rarely biternate); segments obovate to oblanceolate, obtuse. *Racemes* short, 5–20(–25)-flowered. *Bracts* about as long as pedicels or slightly longer, shallowly to deeply



FIG. 1. A-C, *C. solida* subsp. *densiflora*. A, *Todaro* 211 (S); B, *Huter, Porta & Rigo* 329 (GB); C, *Todaro* s.n., Monte Sono (S); D-F, *C. solida* subsp. *incisa*. D, *Samuelsson & Zander* 341 (S); E, *Alston & Sandwith* 1542 (S); F, *Dörfler* 294 (GB). (f) flower; (b) bract; (lp) lower petal; (c) capsule.

palatisect or apically dentate. *Pedicels* 7–15(–20)mm long, slender. *Corolla* (15–) 18–23mm, lilac, rarely white, red, pink or purplish blue; lower petal usually with a prominent pouch at base, broadly emarginate. *Fruit* 11–20mm, pendent, usually distinctly geniculate at base of the long style. $2n = 16, 24, 32$. Self-sterile.

Deciduous forests and parks, 0–1000m. Most of Europe, except in the south and west. Bu, Co, Ga, Hs, It, Ju, Sa.

In South Tyrolia a variety with large broadly winged flowers, somewhat similar to subsp. *incisa* is recognized as var. *australis* Hausm. (*Fl. Tirol* 42, 1854). Some specimens from S France (Basses Alpes, Reverchon 88, E) are transitional to subsp. *incisa* in the division of the bracts.

It seems difficult to distinguish between wild and naturalized stands in many parts of the distribution area.

d. subsp. *densiflora* (Presl) Hayek, Prodr. Fl. Penins. Balcan. 1:364 (1925) excl. appl. Fig. 1A–C.

Syn.: *C. densiflora* C. & J. Presl, Del. Prag. 1:10 (1882); *C. solida* var. *densiflora* (Presl) Boiss., Fl. Or. 1:129 (1867); *Pistolochia solida* subsp. *densiflora* (Presl) Holub in Folia Geobot. Phytotax. 8:172 (1973). Type: 'In nemorosis Nebrodum' (Sicily), n.v.

C. solida var. *bracteosa* Batt. & Trabut. in Bull. Soc. Bot. France 52:498 (1905); *C. solida* subsp. *bracteosa* (B. & T.) Greuter & Burdet in Willdenowia 10:231 (1980). Type: Algeria, L'Haizer, Tizi-n-Teslent, 2100m, 25 v 1905, Battandier s.n. (L).

Stems 10–15cm. *Leaves* usually biternate with very broad leaflets which are shallowly cut apically or rarely deeply cut into narrowly obovate segments. *Racemes* very dense. *Bracts* shorter and broader than in subsp. *incisa*, apically divided into short segments which are usually again shallowly cut at apex. *Pedicels* very short, 4–8mm long. *Corolla* 16–21mm long with 8–12mm long spur; lower petal broadly obtuse, 10–12mm. *Fruit* short and broad with very short straight style. *Seeds* larger than in subsp. *incisa*.

S Italy, Sicily and Algeria. It, Si, Ag.

Some specimens of this subsp. are similar to *C. pumila* in habit, but have longer racemes, larger flowers and longer and narrower nectaries.

4. *C. integra* Barbey & Major in Stefani, Major & Barbey, Samos 30 (1892).

Syn.: *C. majori* v. Poelln. in Repert. Spec. Nov. Regni Veg. 45:104 (1938); *Pistolochia majori* (v. Poelln.) Holub in Folia geobot. Phytotax. 8:8:172 (1973). Type: Montis Kerki, Samos, Major 625 (K).

C. wettsteinii Adam. in Österr. Bot. Z. 56:174 (1906); *C. solida* subsp. *wettsteinii* (Adam.) Hayek, Prodr. Fl. Penins. Balcan. 1:364 (1925); *C. solida* var. *densiflora* subvar. *wettsteinii* (Adam.) v. Poelln. in Repert. Spec. Nov. Regni Veg. 45:111 (1938); *Pistolochia solida* subsp. *wettsteinii* (Adam.) Soják in Cas. Nar. Muz. (Prague) 140:128 (1972); *Pistolochia wettsteinii* (Adam.) Holub in Folia Geobot. Phytotax. 8:172 (1973). Type: Mt Athos, Adamowicz 1906 (WU, n.v.).

C. caucasica var. *sintenisii* v. Poelln. in Repert. Spec. Nov. Regni Veg. 45:100 (1938). Type: Dardanellen bei Giaur-Hissar, 18 iii 1883, *Sintenis* 234 (B, E, L).

C. caucasicasensu Davis & Cullen in Davis, Fl. Turkey 1:240 (1965) p.p. (Vil. Bolu).

Plant 10–20(–30)cm, with 0–3 branches. *Leaves* glaucous, mostly biter-nate with \pm divided leaflets with obovate to oblong segments. *Racemes* 5–20-flowered, lax. *Bracts* entire, broadly elliptic, or the lower 2–5-fid. *Corolla* pale pink to almost white; lower petal broadly spatulate, emarginate. *Fruit* 15–20mm, linear to narrowly lanceolate with prominent midveins. *Stigma* with geminate lateral papillae. $2n = 16$. Self-sterile. NE Balkan peninsula, Aegeis, W Anatolia, AE, An, Bu, Gr. Fig. 3.

The European representatives (= *C. wetsteinii* Adam.) are usually robust and very variable in the bracts. Some specimens have all bracts entire, whereas in others most bracts are divided. This may even differ between branches of the same specimen. In contrast to the Anatolian specimens, the European ones have dark-tipped petals.

5. *C. triternata* Zucc. in Abh. Münch. Acad. 3:251 (1843). Fig. 2.

Syn.: *C. solida* var. *brachyloba* Boiss., Fl. Or. 1:129 (1867); *C. solida* subsp. *brachyloba* (Boiss.) Cullen & Davis in Notes RBG Edinb. 25:44 (1963) excl. appl. Type: Mt Lebanon, Roth & Erdl, Iter Schubert (M?, n.v.).

Plant 15–20cm high, often with several branches from the scale leaf axil. *Racemes* 5–15-flowered, lax, long. *Bracts* 8–10(–17)mm, lobed, central lobe usually largest. *Pedicels* slender, elongating in fruit, longer than bracts. *Corolla* pale, with spur of upper petal 13–15mm; inner petal 10–11mm; lower petal 11–12mm, broadly spatulate, emarginate, with a

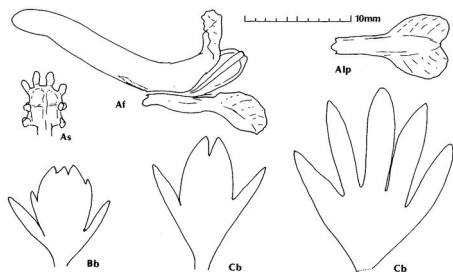


FIG. 2. *C. triternata*. A, Archibald 1056 (E); B, Davis 5398a (E); C, Polunin 5330 (E). (f) flower; (b) bract; (lp) lower petal; (c) capsule; (s) stigma.

diminutive spur at base. *Fruit* lanceolate. *Stigma* with geminate lateral papillae. *Nectary* short, 3–4mm.
Lebanon and Syria. LS. Fig. 3.

6. *C. caucasica* DC., Syst. Nat. 2:119 (1821).

Type: In montibus sylvaticis Caucasi, *M. Bieb.* (n.v.).
Caucasus, NE Anatolia. An. Fig. 3.

CORYDALIS ANGUSTIFOLIA GROUP (7–13)

This group of species, confined to SW Russia, Anatolia and Kurdistan, is recognized by rather tough stems, leaves and racemes which are pressed to the ground before anthesis, a stigma which lacks geminate lateral papillae, a long caudate nectary and a usually straight lower petal. Usually more than one axillary branch grows out from the scale leaf. It comprises about seven species, all of which occur in the Med-Checklist area.

7. *C. wendelboi* Lidén, *sp. nov.* Fig. 4.

Syn.: *C. solida* var. *tenuisecta* Boiss., Fl. Or. 1:129 (1867). Type: SW Anatolia, in montibus Cariae, *Pinard* s.n. (G-BOISS., microfiche).

C. solida var. *densiflora* auct., non *densiflora* Presl.

C. solida subsp. *solida* sensu Cullen & Davis in Notes RBG Edinb. 25:44 (1963).

Folia triternatisecta lobis ultimis anguste obovatis ad linearibus. Racemi multiflori, densi, spicati, primum nutantes, demum erecti. Bracteae parvae flabellatae plerumque profunde incisae pedicellis brevissimis (3–5mm longis) longiores. Flores pallide rosei ad sordide violacei. Petala exteriora anguste alata non emarginata. Petalum inferius basin non

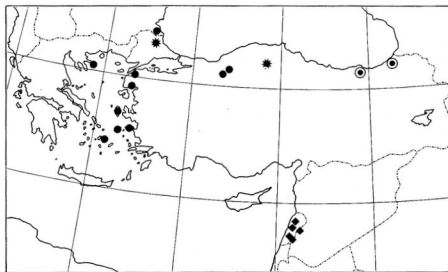


FIG. 3. Distribution of *Corydalis* species in east Mediterranean. (●) *C. integra*; (★) *C. solida* aff. subsp. *slivenensis*; (◐) *C. caucasica* (Turkish distribution only); (◆) *C. triternata*.

saccatum. Nectarium longum. Stigma papillis lateralibus non geminatis. Capsula lanceolata, 6–11-sperma. Semina nitida, 1.5–1.9mm.

Type: Turkey C2, Mugla, Yesil Göl Dag, between the peaks, limestone, 1500–1800m, 23 iv 1972, Runemark & Wendelbo 219 (holo. GB).

Plant (5–)10–15cm high. Leaves triternate with narrowly obovate to linear ultimate leaflets. Racemes (5–)10–20(–25)-flowered, very dense, or \pm lax, long and narrow; nodding at apex, becoming straight. Bracts rather small, c.10mm long, broadly flabellate, divided into several lobes, these usually further laciniate or dentate. Pedicels very short, (2–)3–5(–7)mm long. Corolla variable in colour: pale pink, almost white with a rosy tinge, or maroon; apex of inner petals often with dark purple margins, but with pale dorsal wings; spur 9–13mm, about as long as the inner petals; outer petals narrowly winged, obtuse; lower petal slightly subspathulate, 10–13mm. Fruit lanceolate, 6–11-seeded, (12–)15–20 \times 3–5mm. Stigma with simple lateral papillae. Nectary 5–7mm. Seeds 1.5–1.9mm, smooth. $2n = 16$. Self-sterile.

Limestone rocks and pine forests, 700–2000m. W Anatolia. An. Fig. 7.

TURKEY: Aucher-Eloy 403 (G-BOISS); 4055 (G-BOISS); Balls 627 (E); Baytop 11294 (E); Davis 21546 (E); 21576 (E); 25582 (E); 25616 (E); 41623 (E); Demirtz 4521 (E); 4555 (E); 4560 (E); 5036 (E); Ekim 709 (E); Hennipmann et al. 777 (B); Karamanoglu 5399 (E); Kukkonen 5404 (E); Lewejohann & Holtz Tu 74–056 (E); Nydegger 40220, 41006, both n.v. (Huber-Morath in *Candollea* 42: 717, 1987); Pinard s.n. (G-BOISS); E. M. Rix et al. 1532 (E); Rückbrandt s.n. (E); Runemark & Wendelbo 45 (GB); 213 (GB); 219 (GB); 333 (GB); 359 (GB); 446 (GB); Sintenis 3821 p.p. (E); Tobey 577 (E); 577A (E); 1855 (E); 2798 (E).

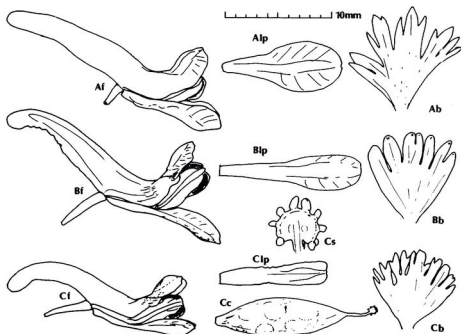


FIG. 4. *C. wendelboi*. A, Vil. Kastamonu, sine coll (cult., GBG); B, *Wendelbo* 37C (cult., GBG); C, *Wendelbo* 108C (cult., GBG), (f) flower; (b) bract; (lp) lower petal; (c) capsule; (s) stigma.

This species has a clearcut geographical variation: specimens from central Anatolia (Ankara vilayet) have narrowly linear leaf laciniae; specimens from N Anatolia have much broader lower petals and much denser racemes.

The specific epithet commemorates the late Prof. Per Wendelbo, who prepared the account of *Corydalis* for *Flora Iranica*, and brought home tubers of several species still cultivated in the Göteborg Botanical Garden, among them two collections of *C. wendelboi*.

8. *C. paschei* Lidén, sp. nov. Fig. 5A.

Caules et folia primum terrae adpressi, caules demum erecti. Folia biternata petiolulis longis foliolis ultimis rotundatis plus minus divisis lobis obtusis imbricatis. Racemi laxi, 6–19-flori. Bractae parvae rotundatae apicem versus parum divisae pedicellis longis breviores. Flores pallide rosei. Petala exteriora valde alata apice emarginata. Petalum inferius parum saccatum. Capsula lanceolata. Semina pauca, nitida. Stigma papillis lateralibus non geminatis.

Type: Turkey C2, Antalya, Kas to Elmali, south side of Çibeli pass, 1400m, eroded ditch, 2 iv 1985, E. Pasche & M. Koenen 8505 (holo. GB, iso. E).

Plant 10–15cm. Stems decumbent with leaves close to the ground. Leaves ternate with long petiolules, leaflets again ternate with broad, rounded lobes which are \pm deeply incised into rounded imbricate segments. Racemes very lax, 6–19-flowered. Bracts small, rounded, apically shallowly incised, much shorter than the 10–18mm pedicels. Corolla pink with the outer petals broadly winged and emarginate at apex; spur 14mm, somewhat inflated apically; lower petal with a slight subbasal pouch; inner petals 10mm. Fruit lanceolate, few-seeded, 12–15mm. Seeds smooth. Stigma with simple lateral papillae. $2n=16$. Self-sterile.

W exposed moist rocky slopes in *Pinus* and *Cedrus* woodland; 900–1400m. SW Anatolia. An. Fig. 7. See note p.363.

9. *C. tauricola* (Cullen & Davis) Lidén, stat. nov. Fig. 5B.

Syn.: *C. solida* subsp. *tauricola* Cullen & Davis in Notes RBG Edinb. 25:45 (1963). Type: Turkey C5, Içel, Namrun, 1000–1800m, rocky limestone, 15 iv 1933, Balls 176 (holo. E, iso. K).

C. solida subsp. *brachyloba* (Boiss.) Cullen & Davis, op. cit.: 44 (1963) excl. type.

Plant 10–20cm. Leaves with obovate to oblanceolate segments. Racemes 5–15(–20)-flowered. Pedicels 7–15mm. Bracts 3–6-fid Corolla pale pink; outer petals oblong-spathulate, slightly emarginate at apex, often with a mucro in the sinus; spur 12–14mm, about as long as the lower petal, directed upwards; lower petal not spurred; inner petal 11–12mm. Fruit uniseriate, torulose, 3–8-seeded, 18–28 \times 2mm; seeds 1.7–2.2mm, smooth. Stigma with simple lateral papillae. Nectary 8–9mm. $2n=16$. Self-sterile.

Limestone rocks (under hedges, oak forest), 500–2100m. Cilician Taurus, Amanus. An. Fig. 7.

TURKEY: Aucher-Eloy 401 (G-BOISS); Balls 176 (E); 992 (E); Cheese 2492 (E); Coode & Jones 857 (E); 996 (E); Davis 26061 (E); 26061 (E); 26094 (E); 26350 (E); 26591 (E); 26683 (E); 27057 (E); Kotschy 109 (G-BOISS, UPS); Nydegger 40219 n.v. (Huber-Morath in Candollea 42:717, 1987); Siehe 140 (B); 153 (B); Yural 1221 (E).

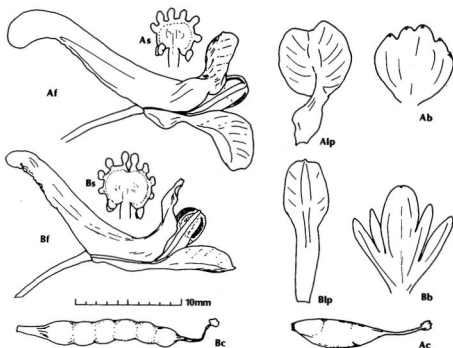


FIG. 5. A, *C. paschei*, type (cult., GBG); B, *C. tauricola*, Taurus mountains, H. Andersson (cult., GBG). (f) flower; (b) bract; (lp) lower petal; (c) capsule; (s) stigma.

10. *C. haussknechtii* Lidén, sp. nov. Fig. 6A.

Syn.: *C. caucasica* in Boissier, Fl. Or. suppl. 25 (1888).

C. integra sensu Townsend in Townsend & Guest, Fl. Iraq 4:824 (1980); Wendelbo in Rechinger, Fl. Iranica 110:22 (1974); Davis & Cullen in Davis, Fl. Turkey 1: 240 (1965) p.p.

Herba 10–22cm alta. Folia biternata petiolis longis foliolis profunde incisive lobis obovatis vel lanceolatis, obtusis vel acutis. Racemi 6–22-flori, laxi, fructu elongati. Bracteae obovatae-oblongae, indivisae, anthesi 6–15mm longae, fructu ad 13–32mm elongatae. Pedicelli gracili, anthesi 10mm longi, fructu ad 23mm elongati. Corolla pallide rosea ad albida, 20–25mm longa calcaribus 13–17mm longis inclusa. Petala exteriora valde alata apice emarginata. Petalum inferius basin non saccatum. Petala interiora 11–12mm longa, apice obscura. Capsula (immatura) lanceolata, 15–17mm longa, stylus 4mm inclusa, 5–8-sperma. Semina ignota. Stigma papillis lateralibus non geminatis.

Type: South Anatolia, Vil. Mardin, Derik, iv 1867, *Haussknecht* 28 (holo. BM, G-BOISS, microfiche!).

Stems 10–22cm. Leaves green, biternate with deeply divided leaflets; segments broadly to narrowly obovate to lanceolate, obtuse or acute. Racemes 6–22-flowered, lax, elongating in fruit. Bracts obovate-lanceolate, entire, 6–15mm in flower, lengthening considerably in fruit up to 32mm. Pedicels 8–15(–23)mm, reflexed in fruit. Corolla pale pink to white with the apices of the inner petals dark-tipped; outer petals broadly winged, emarginate at apex; spur of upper petal directed upwards, 13–17mm long; lower petal without a basal pouch; inner petals 11–12mm long. Fruit (immature), 15–17mm including style c.4mm, lanceolate,

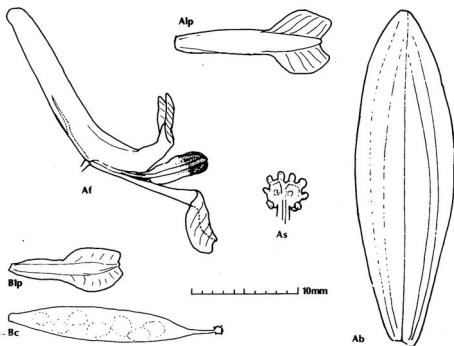


FIG. 6. A, *C. haussknechtii*, Wheeler Haines s.n., 16 v 1957 (E); B, *C. brevipedicellata* (type, B). (f) flower; (b) bract; (lp) lower petal; (c) capsule; (s) stigma.

5–8-seeded. Stigma lacking geminate lateral papillae. Nectary caudate, 6–7mm. Fl. 3–5.

'Rich soil between rocks', 1000–2800m Kurdistan. An. (Iraq). Fig. 7.

TURKEY. Haussknecht 28 (G-BOISS); Nydegger 41295 n.v. (Huber-Morath in *Candollea* 42:717, 1987); Post n.v. (Fl. Or. suppl. 25). IRAQ. Boswell & Chapman s.n. 28/4 1957 (E); Wheeler Haines s.n. 16/5 1957 (E); the following probably also belong here (all n.v.), Guest 1206, Low 218B, 218C, Polunin 5051, Poore 633, Rogers 9205 (Wendelbo in *Fl. Iranica* 110:23).

Similar to *C. tauricola* in general habit, but with much longer, entire bracts and broadly winged, deeply emarginate outer petals.

11. *C. angustifolia* (Bieb.) DC., Syst. Nat. 2:120 (1821).

Syn.: *Fumaria angustifolia* M.Bieb., Fl. Taur. cauc. 2:146 (1808); *Pistochia angustifolia* (Bieb.) Holub in Folia Geobot. Phytotax. 8:172 (1973). Type: 'Hab. in Iberia' M. Bieb. (n.v.).

Similar to *C. tauricola* and *C. haussknechtii*, but leaf segments narrower, bracts 3-fid or the upper often entire, corolla cream or white, or with a slight lilac suffusion, 23–28mm with comparatively shorter spur, and fruit 25–30mm. $2n = 16$. Self-fertile.

NE Anatolia (Caucasus, N Iran). An.

12. *C. paczoskii* Busch, Fl. Cauc. crit. 3(4):55 (1905).

Syn.: *C. solida* var. *pauciflora* Paczosk in Zap. Kiev. Obsch. Estestv.

10(2):421 (1899); *Pistolochia paczoskii* (Busch) Soják in Cas. Nar. Muz. (Prague) 140:128 (1972). Type: 16 iv 1889, *Paczosk* (n.v.).

Similar to *C. angustifolia*, but leaves less divided, racemes lax, few-flowered and corolla smaller, lilac, with the inner petals dark-tipped. $2n=16$. Self-fertile. Crimea. RK.

13. *C. brevipedicellata* Lidén, sp. nov. Fig. 6B.

Folia bi- vel triternatisecta segmentis ultimis oblongis obtusis. Bractee 3-5-divisae vel integrae pedicellis brevissimis (3-6mm longis) multo longiores. Petalum inferius 11mm longum, apice alatum emarginatum. Capsula anguste lanceolata, 19-24mm longa, 4-9-sperma. Stigma papillis lateralibus non geminatis. Semina 1.5mm longa, nitida. Type: West Anatolia, Mahmud Dag, supra Armutli, 21 iv 1933, O. Schwarz 485 (holo. B).

Plant 15-18cm, similar to *C. wendelboi* in habit. Leaves bi- to triternatisect with oblong obtuse segments. Racemes 10-13-flowered, rather dense. Lower bracts deeply 3-5-fid, the upper entire, 8-15mm long, becoming smaller upwards. Pedicels short, 3-6mm in fruit, 2-3 times shorter than bracts, patent to recurved in fruit. Lower petal 11mm long, emarginate at apex, with a very slight pouch at base. Fruits lanceolate, 19-24 x 2-3mm with a long straight style, 4-9-seeded. Seeds 1.5mm. Stigma lacking geminate lateral papillae. W Anatolia. An. Fig. 7.

Only after hesitation have I decided to describe a new species from this scanty material. The only flower part available is a single lower petal. *C. brevipedicellata* shows resemblances to *C. wendelboi*, but differs in the longer fruits, the less divided bracts and the emarginate lower petal.

II. SECT. LEONTICOIDES

Corydalis sect. Leonticoides DC., Syst. Nat. 2:114 (1821). Type species: *C. verticillaris* DC.

Tubers perennial, solid, irregular, with roots in fascicles. Stems with

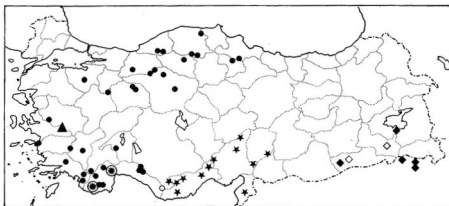


FIG. 7. Known distribution of the *C. angustifolia* group (except *C. paczoskii* and *C. angustifolia*). (●) *C. wendelboi*; (★) *C. tauricola*; (◆) *C. haussknechtii*; (⊙) *C. paschei*; (▲) *C. brevipedicellata*. Open symbols indicate a record from literature.

two opposite sessile leaves. Bracts entire. Sepals larger than in the previous section. Nectary obtuse, long, fused to the spur for most of its length. Represented in our area by the *C. rutifolia* group, which also comprises a further two to four taxa in Caucasus and Iran. All species in this section are self-sterile.

14. *C. erdelii* Zucc. in Abh. Math.-Phys. Cl. Königl. Bayer Akad. Wiss. 3:251 (1843).

Syn.: *C. rutifolia* (Sm.) DC. subsp. *erdelii* (Zucc.) Cullen & Davis in Notes RBG Edinb. 25:45 (1963) p.p.; *Pistolochia erdelii* (Zucc.) Soják in Cas. Nar. Muz. (Prague) 140:128 (1972). Type: In monte Lebanon, Roth & Erdl, Iter Schubert (M?, n.v.).

Cryptoceras pulchellum Schott in Österr. Bot. Wochenbl. 7:149–150 (1857). Type: In monte Tauro 1836, Schott & Kotschy 15 (S).

Leaves irregularly bi- to triterminate with lanceolate leaf-lobes, the lateral ones usually much smaller. Racemes 5–11-flowered, elongate. Pedicels 10–15mm long. Corolla 15–20(–22)mm, lacking a rim at apex of outer petals, pale pink, often with a pinkish-purple spur; spur 9–13(–15)mm long; inner petals 6–9mm long. Fruit 7–10-seeded. $2n = 16$.

Limestone, stony slopes, snowpatches, 1300–3450m. SC to SW Anatolia, Lebanon, Syria, Palestine. An, Li, Pa, Sy. Fig. 8A.

TURKEY. Balls 930 (E); T. Baytop 13008 (E); Coode & Jones 1355 (E); Davis 26677 (E); Kotschy 108 (G-BOISS); 108 (S, UPS); Nydegger 40219, n.v. (Huber-Morath in Candollea 42:717, 1987); Parry 196 (E); E. M. Rix et al. 681 (E); 1584 (E); 1821 (E); Runemark & Wendelbo 210 (GB); 332 (GB); 444 (GB); 445 (GB); 546 (GB); Schott & Kotschy 15 (S); W. Siehe 207 (E); Vural 1226 (E).

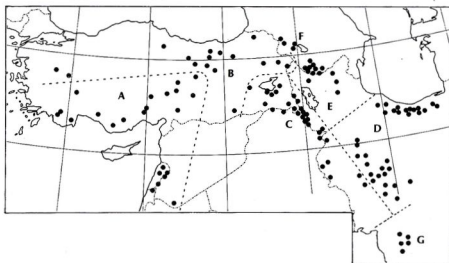


FIG. 8. Known distribution of the *C. verticillaris* complex A, *C. erdelii*; B, *C. oppositifolia* subsp. *oppositifolia*; C, *C. oppositifolia* subsp. *kurdica*; D, *C. verticillaris* s. str. (incl. subsp. *boissierii* (Prain) Wendelbo, subsp. *grandiflora* Wendelbo and *C. persica* Cham. & Schlecht.); E and F include *C. persica* auct., non Cham. & Schlecht., *C. nariniana* and *C. erdelii* auct., non Zucc., a complex needing further study; G, a small-flowered taxon, similar to *C. verticillaris*. The Caucasian distribution is taken from Grossheim, *Flora Kaukasa*, IV: 106–121 (1950).

15. *C. oppositifolia* DC., Syst. Nat. 2:114 (1821).

Syn.: *Pistolochia oppositifolia* (DC.) Holub in Folia Geobot. Phytotax. 8:172 (1973). Type: inter Alep et Mosul, *Olivier* s.n. (holo. P, iso. B).

Distinguished from *C. erdelii* by the larger (20–25mm), more deeply and evenly coloured corolla with a distinct marginal rim at apex of outer petals, a spur 11–18mm long, and inner petals 9–11mm. Fruit with 11–13 seeds.

The distinction between the two subspecies recognized here is not very clearcut, and may perhaps rather represent a clinal variation. *C. oppositifolia* is separable from the more Eastern *C. verticillaris* by its shorter spurs, purple corolla, and a different leaf-segmentation. The subsp. *oppositifolia* is similar to the Caucasian *C. nariniana*., which seem to differ by the leaf form and the coloration of the corolla.

a. subsp. *kurdica* (Cullen & Davis) Lidén, comb. nov.

Syn.: *C. rutifolia* subsp. *kurdica* Cullen & Davis in Notes RBG Edinb. 25:45 (1963); *Pistolochia kurdica* (Cullen & Davis) Holub in Folia Geobot. Phytotax. 8:172 (1973). Type: Turkey C9 Vil. Hakkari, Çilo Dag, 10km NW of Çilo Tepe, 3300m, by snow line, *Davis & Polunin*, D. 24185 (holo. E).

C. verticillaris subsp. *verticillaris* sensu Wendelbo in Rechinger, Fl. Iranica 110:17 (1974) p.p.

C. rutifolia sensu Townsend in Townsend & Guest, Fl. Iraq 4:826 (1980).

Leaves bi- to triternate with leaflets irregularly cut into lanceolate acute lobes, usually with the terminal lobe much larger than the lateral. It is very variable in leaf segmentation, and covers most of the variation-range from *C. erdelii* to *C. verticillaris*.

High mountains near snowline, 1000–3500m. Kurdistan (SE Anatolia, N Iraq, NW Iran). An. Fig. 8C.

TURKEY. Archibald 7635 (E); Davis 22492 (E); 22796 (E); 24158 (E); 45534 (E); 45593 (E); Watson et al. 2812 (E); Nydegger 41294, n.v. (Huber-Morath in Candollea 42:717, 1987).

b. subsp. *oppositifolia*

Syn.: *C. rutifolia* (Sm.) DC. subsp. *erdelii* (Zucc.) sensu Cullen & Davis in Notes RBG Edinb. 25:45 (1963) p.p., non *C. erdelii* Zucc.

Similar to subsp. *kurdica*, but leaves usually biternate with rounded to elliptic, acute or obtuse, more or less equally sized leaf lobes. Flowers usually 25mm long. $2n = 16$.

Near melting snow, 1300–2800m. N and E Anatolia. An. Fig. 8B.

TURKEY. Balansa 63 (G-BOISS); Balls 253 (E); 269 (E); Brown 431 (E); Coode & Jones 2522 (E); 2716 (E); Davis 31300 (E); 44478 (E); Haussknecht s.n. (B, G-BOISS); Lamond 2627 (E); Manissadjian 757 (L, S); Mitchell 2618 (E); Olivier (P, B); Polunin 14267 (E); S. M. Rix et al. 1642 (E); Sauer 300 (E); Sinteris 116 (L); 143 (L); 5452 (E, L, UPS); 5453 (L); Stainton & Henderson 8356 (E); Tobey 637 (E); Uotila 15650 (E).

16. *C. rutifolia* (Sm.) DC., Syst. 2:115 (1821).

Syn.: *Fumaria rutifolia* Sm. in Sibthorp & Smith, Fl. Graec. Prod. 2:49; *Pistolochia rutifolia* (Sm.) Soják in Cas. Nar. Muz. (Prague) 140:129 (1972). Type: 'In insula Cypro', Sibthorp (OXF, n.v.).

Differs from *C. erdelii* in the less divided leaves and usually longer corolla with a narrow rim to the outer petals, and from both the previous species in the few-flowered racemes, shorter pedicels, whitish flowers (sometimes with a slight bluish suffusion) with maroon markings at apex, and short, broad, 4-6-seeded capsules.

a. subsp. *rutifolia*.

Stems 4-10(-15)cm. Racemes 3-10-flowered, and pedicels often exceeding 10-15mm in fruit.

Cyprus; Rodos (*Aucher-Eloy* 1832, n.v. according to A. Carlström, *Checklist of vascular plants from Rodos* 49, 1987). Cy, AE?

b. subsp. *uniflora* (Sieber) Cullen & Davis in Notes RBG Edinb. 25:45 (1963).

Syn.: *Fumaria uniflora* Siber, *Reise in Kreta* 2:320 (1823); *C. uniflora* (Sieber) Nyman, *Syll. Fl. Eur.* 185 (1854); *C. rutifolia* var. *subuniflora* Boiss. & Heldr., *Diagn. ser. 1*, VIII: 11 (1849); *Pistlochia uniflora* (Sieber) Soják in *Cas. Nar. Muz. (Prague)* 140:129 (1972). Type: Crete, Mt Dikhti, *Sieber* (n.v.).

Plant usually dwarf, 2.5-5(-10)cm. Racemes 1-4-flowered, and fruiting pedicels c.10mm.

Crete; 'Island of Andros' (one sheet in E, lacking collector, date and number). Cr, Gr.

Note added in proof:

New records—

C. paschei: SW Turkey, 28km from Kasaba to Sinekçibeli pass, *J. Persson* 87-40(GB); Termessos, W Antalya, 900m, most bracts rounded, entire, 6 iv 1988, *H. Zetterlund* 88-29(GB).